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Use of science in British newspapers' narratives of climate change

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Abstract

This paper investigates the use of science in British newspapers' narratives of climate change between 1988 and 2016. It is based on the analysis of eight newspapers and their Sunday and online versions (*Daily Mail*, *Daily Mirror*, *The Daily Express*, *The Sun*, *The Times*, *The Daily Telegraph*, *The Guardian*, *The Independent*). We used the keywords "climate/climatic change", "warm/warming" and "greenhouse/greenhouse effect" to retrieve the articles from the Nexis/Lexis database. To identify the articles with a specific focus on climate change, we included only those containing the keywords in the headline (9789 items). Framing theory helps interpret the process of construction of the "threat" through science by showing a tendency towards scientific consensus for the centre/left-leaning newspapers, and an instrumental use of consensus for the centre-right. These findings are useful for both scientists and policymakers interested in understanding how climate narratives can promote delay in action on climate change.

Keywords

climate framing, scientific frames, climate science communication, climate change, global warming

1 Introduction

The study of journalistic framing has been considered by some sociological approaches as relevant to interpret contemporary understanding of climate change (CC) also in relation to the different presentations of CC by media reporting. This means that scientific knowledge and content might be framed in a way that is subject to cultural "influences, political expectations, and narrative requirements" (Arnold, 2018, p. 38). This paper examines a potential evolution of themes associated with the use of scientific frames in British newspaper reporting and the prominent stories associated with the use of scientific frames over time by focusing on British newspapers reporting on CC between 1988 and 2016. The analysis is guided by narrative and framing theories. Narratives are usually considered at a macro-level in which the interpretation of the chronological facts is provided by the narrator(s), similarities among multiple narratives of the same events are identified and responses to "what" questions are provided. Framing

tends to be associated with micro-perspectives, "how" questions and the interaction of different frames, which might also generate conflicts. However, "frames serve as the underlying foundations on which narratives are expressed" (Aukes, Bontje, & Slinger, 2020, "Narrative and Storytelling" vs. 'Frame and Framing,' para. 1). Combining the two approaches, this paper investigates questions related to both how CC is scientifically framed and what the main narratives (and their evolution) are. Following Arnold (2018), the analysis of journalistic framing is relevant from a sociological point of view because media and scientific reporting tend to present the issue in different ways. This means that scientific knowledge and content might be framed in a way that is subject to cultural "influences, political expectations, and narrative requirements" (Arnold, 2018, p. 38). Since the 1990s, concerted research efforts have focused on the role of journalistic reporting in framing CC (Bell, 1994; Boykoff, 2014; Trumbo, 1996; Ungar, 1992; Weingart, Engels, & Pansegrau 2000; Wilkins, 1993). The literature



frequently holds mass media responsible for mediating communication processes between science, policy, and the public, by presenting both causes and consequences of CC, thus influencing public opinion and influencing climate governance (Boykoff, 2009; Rick, Boykoff, & Pielke, 2011). This suggests that journalistic reporting can frame CC science as “good” or “bad” science, by emphasising, or by contrast diminishing, specific aspects of the phenomenon. Therefore, the guiding research question of this paper relates to “how” newspapers use science to represent CC-related issues and to narrate the “what”. This work focuses on British newspapers because, despite an increasing number of challenges in news production (e.g., migration of news consumers to online platforms), the UK newspaper industry still reaches most of the UK population (Mediatique, 2018), and 90% of adults in Great Britain consume either print or online newspapers (NRS, 2017). Nevertheless, in the context of CC, the literature shows that UK newspapers give space to a plurality of voices even though they represent a minority (Boykoff & Mansfield, 2008; Painter & Gavin, 2015). Finally, news articles are more comprehensive in terms of both reporting existing online discourses and introducing issues / content on the public agenda (Hellsten & Vasileiadou, 2015).

The first section of the paper presents the study background and a literature review on framing CC. The second section describes the method used for both selecting and analysing a sample of articles. The third section (and its related sub-sections) reports the results of a thematic analysis that explores the themes connected to the use of scientific frames. The final section discusses the results and suggests some implications.

2 Study background

The First World Climate Conference in 1979 urged governments to tackle CC as a world problem (UNFCCC, 2006). Later, the first report by the Intergovernmental

Panel on Climate Change (Houghton, Jenkins, & Ephraums, 1990) identified the need for framing the global climate crisis as the most urgent environmental problem. The IPCC First Assessment Report in 1990 identified some areas of uncertainty that derive from several factors (Rice, Gustafson, & Hoffman, 2018) related to both the evolution of the phenomenon and the exact impact of CC. CC discourses rely on scientific knowledge, but also media frameworks (Rhomborg, 2010). Entman (1993, p. 52) describes the framing process as a selection of some aspects that make a piece of news memorable by providing “problem definition, causal interpretation, moral evaluation, and / or treatment recommendation for the item described”. Framing has been conceptualised in many ways, especially in relation to media effects theory. On the one hand, the media has been defined as recipients of external content, which is interpreted by individuals and “crystalised” by journalists in the public discourse (Gamson & Modigliani, 1989). On the other hand, they have been recognised to contribute towards constructing social reality by framing reality in a “patterned way” (McQuail, 1994, p. 331). These dynamics have been described as the “framing effect”, that refers to changes produced in terms of public opinion by the presentation of an issue in certain ways (Chong & Druckman, 2007). However, in both cases, despite a different intensity of the effects produced, the media are held responsible for filtering and channelling the interpretation of such reality (Scheufele, 1999). The literature also suggests that a framing effect will vary according to several factors including the context (e.g., one-sided context or competition with other frames). This is particularly evident in reporting on environmental issues (Griffin & Dunwoody, 1997) when several interpretations of the variety of scientific perspectives are provided by intermediate actors, among whom the media play a significant role (Berglez, 2011; Brüggemann, 2014; Gibson, Craig, Harper, & Alpert, 2015). This suggests that the media actively contribute to the definition of a social problem (Trumbo, 1996), here

intended as a particular situation that is perceived by the public as outside socially shared norms, and needs to be targeted by policies (Gusfield, 1989). In this direction, the media provide the public with specific interpretations of science (Rahmstorf, 2012). In the specific case of reporting on climate change, frames are defined as a scientific angle by the journalist (Griffin & Dunwoody, 1997) who legitimises specific voices that speak about the climate (Boykoff, 2013; O'Neill, 2013). They select and establish who the “experts” are and promote specific ways of conceptualising CC (O'Neill & Smith, 2014; Rebich-Hespanha, Rice, Montello, Retzlöff, Tien, & Hespanha, 2015). Therefore, since the complexity of CC is difficult to be communicated by the media (Anderson, 1997), the media might adopt scientific frames to emphasise specific aspects, (in)action and voice, but it does not necessarily mean that they rigorously report scientific findings. Previous studies highlighted that mass media tend to represent a conflict in climate science by giving a “disproportionate” space to contrarian voices even though they represent the minority within the scientific community (Akerlof, Rowan, Fitzgerald, & Ceden, 2012; Boykoff, 2013; Rahmstorf, 2012). In turn, this produces inaccuracy (Shaw, 2013; Vestergård, 2011) and distortion of scientific results (Höppner, 2010; Jennings & Hulme, 2010). Given these premises, the overall aim related to the use of science in CC reporting is articulated in two main sub-questions. The first question relates to the evolution of CC scientific frames in British newspaper reporting over time:

RQ 1: How have scientific frames of CC evolved in British newspaper reporting?

Framing provides interpretive packages schemas (Gamson & Modigliani, 1989; Scheufele & Tewksbury, 2007) of CC, that may explicitly or implicitly promote specific pathways of action / inaction (Moser, 2010). Framing is intended here as “the process which implies a strategic selection (conscious or not) of language features for a particular purpose” (Fløttum & Gjerstad,

2017, p. 2). Specifically, the definition of scientific frames provided by Severson and Coleman (2015) is based on positive and negative forms. However, while the authors specifically refer to CC consequences (e.g., scientific frames that highlight positive or negative consequences of action / inaction), we consider the multidimensionality of CC as represented by news media using science. Therefore, this work identifies scientific frames based on the adoption of scientific voices and reporting of scientific studies in the corpus of the news articles to support the multidimensional narrative of CC.

Scientific consensus around the existence of CC and its anthropogenic causes has been increasingly recognised in media reporting (Boykoff, 2007; Gibson et al., 2015; Grundmann & Scott, 2014; Jang & Hart, 2015). In the UK, elite newspapers (2000–2010) were found to represent specific voices that speak for the climate with a combination of processes of politicisation and journalistic logics (Matthews, 2015), defined as the routinised process through which the journalists “construct” (Tuchman, 1978) and communicate information (Altheide & Snow, 1988). However, in CC reporting, in addition to both political valence and media logics, at least a third dimension has been identified in scientific terms. In fact, media routines interact with both climate science and political valence to represent the reality of climate change (Kunelius, 2014). Some approaches have contextualised the intersection between these three levels in the neoliberal scenario by attributing to the press culture a tendency to politicise public matters and represent conflictual instances between political and scientific campaigning. In turn, such a dichotomic representation produces an image of both scientists and politicians as self-interested (Cappella & Jamieson, 1997) and focused on their own agenda rather than on public matters. CC, translated in such “media logic” (Berglez, 2011), becomes a mediated political event (Akerlof, Rowan, Fitzgerald, & Ceden, 2012). Therefore, media construction of climate news in scientific terms means that the scientific frames are also infused

of political connotation, that is in turn embedded in a neoliberal scenario in which sceptics and advocates contend the meaning of CC (Berglez, 2011).

Looking at the evolution of climate narratives in 1988, the UK press represented CC as a multidimensional threat caused by both human and “non-human” processes (e.g., solar sunspots). After 1988, CC narratives started to be influenced by the partisan nature of the debate (Carvalho, 2005, 2007). The mutability of the media representation of CC and the multidimensionality of the phenomenon progressively produced uncertain scenarios firstly about the causes of CC, and then about the effects and actions needed (Grundmann & Scott, 2014; Nerlich & Jaspal, 2014; Painter & Ashe, 2012; Painter & Gavin, 2015). White (1981) suggests that narrative becomes a problem when the real events are translated into the form of a story. This happens when the events, such as in the case of historical chronological facts, are not capable to offer themselves as stories. However, this can be also applied to scientific facts, such as e.g., CC, when the “objectivity” of the science might be narrated through the “subjectivity” of a narrative. Narrative scholars distinguish between structural elements, such as verbal units (Labov & Waletzky, 1997), form, such as genre (Smith, 2005), and content (Jones & McBeth, 2010) of the narrated stories (Arnold, 2018; White, 1987). The definition of narrative adopted here refers to the definition of problems, by identifying causes, responsibilities, and possible solutions (Fløttum & Gjerstad, 2017). This means identifying some communalities among CC stories, narrated by news media, in terms of context, actors presented (villain, heroes, and victims), a plot and (moral) action needed to deal with the effects of the situation narrated (Arnold, 2018). Therefore, the analysis of the narrative is based on an approach that is content-focused and identifies the main topic of a narrative, which in turn allows identifying the active actors, their relationships and actions (Polletta, 2006).

This is directly connected to the second question that investigates the themes associated with the use of scientific frames:

RQ 2: What are the prominent stories associated with the use of scientific frames over time?

The analysis of the topics associated with the use of scientific frames is relevant to understand what topics and aspects of every day are associated with the scientific construction of CC.

3 Methods

British newspapers were chosen owing to the primary role played by Britain in the international politics of CC. Moreover, its news articles are often reproduced by English-speaking print media around the world (Painter & Gavin, 2015). The news articles analysed in this work were retrieved from eight newspapers, and their Sunday and online versions, with highest circulation rates (*Daily Mail*, *Daily Mirror*, *The Daily Express*, *The Sun*, *The Times*, *The Daily Telegraph*, *The Guardian*, *The Independent*). Tabloids, that reach large segments of the population, and news and editorials that inform readers about CC were included to provide a comprehensive picture (Boykoff, 2007; Boykoff & Mansfield, 2008). Following Carvalho (2007), articles containing the keywords “climate / climatic change”, “warm / warming” and “greenhouse / greenhouse effect” in the headlines were retrieved from the Nexis / Lexis database (9789 items). The articles were grouped into three blocks (1988–1997; 1998–2007; 2008–2016) (Table 1). The periods used to observe potential differences across the three blocks were defined in relation to significant shifts described by the literature as drivers for change in climate discourse. The start and end of the first block respectively correspond to the IPCC institution and the definition of the Kyoto Protocol (Carvalho, 2007). Moreover, the end of the second block coincides with the emergence of catastrophe discourses (related to the consequences of CC) in UK

newspaper reporting (Doulton & Brown, 2009), which suggests a shift towards increasing recognition of the reality of CC. Therefore, from a conceptual standpoint, a sort of “maturation” to take place in the journalistic treatment of the issue can be expected. Finally, the Paris Conference (December 2015) represents a historical shift in climate discourse in relation to the definition of responsibilities and binding and tailored targets (Kinley, 2017). The final sample was generated as the ratio between the total number of items included in the block and the number of articles (NItems / NSample), and chronologically extracted (Boykoff & Boykoff, 2004). This also allowed for respecting the fluctuation of the number of articles over the entire period (the sample was larger in years with higher news coverage, see Table 1).

A combination of thematic and narrative analysis on the three periods investigated potential differences across the blocks. Drawing on narrative methods, we explored the evolution of the main themes to examine the development of a “plot” throughout a temporal scale (Floersch, Longhofer, Kranke, & Townsend, 2010). The narrative structure was explored by looking at the actors, motives, and actions in a setting. The exploration of multiple articles supports an understanding of a “meta-narrative” over time (Bishop, 2001). Once the main themes were identified, we recorded the characters, scene, temporal development and actions described (Foss, 1996). These were explored under the overall plot development. Using Bishop’s approach (2001), we focused on the identification of the main themes to explore these dominant elements.

Since narratives are interpreted as a view of the world in a particular way (Foss, 1996), the narrative analysis was complemented by the exploration of the scientific frames adopted to “shape” such narratives. The analysis focused on the identification of actors (with scientific “framing power”, both subject or object of the discourse) and “themes (and sub-themes)”, and how they combine in framing strategies. Scientific frames are intended as a conflictual representation of CC-related aspects

that are justified by scientific arguments and characterised by positive or negative connotations (Severson & Coleman, 2015). We identify a scientific frame whenever a news article includes references either to scientists or to scientific findings within the corpus to explore how they are integrated into broader narratives about CC. An article is classified as adopting a scientific frame when scientists or their findings are used to make some arguments and aspects salient. The following example shows how scientists can be used to support a relation between diseases and warming climate: “Scientists say diseases including dengue fever and the West Nile virus could become common as warmer weather attracts insects from parts of Asia and Africa” (Batchelor, 2015). The themes were identified through an inductive approach based on reading the articles several times and classifying the emergent topic supported by climate science.

Table 1: Sample of articles extracted per block of years

Years	N Items	n Sample
1988–1997	396	197
1998–2007	1933	389
2008–2016	7460	372
Total	9789	958

4 Results

The use of science to justify news articles narratives was found in 308 cases. Table 2 shows an increase in the adoption of science across the three blocks. A first characteristic, emerging from this table, relates to the existence of different themes in relation to the political orientation of newspapers. Given this peculiarity, the following sections discuss the specific themes that emerged by also considering two macro-areas related to centre-left (*Daily Mirror*, *The Guardian*, and *The Independent*) and centre-right (*Daily Mail*, *The Daily Express*, *The Sun*, *The Times*, and *The Daily Telegraph*). Given the difficulty of attributing a precise political orientation to newspapers, as highlighted by the litera-

ture (Edwards & Cromwell, 2006), the two macro-areas were identified through the classification provided by YouGov (2017). The newspapers were selected based on circulation rates. Therefore, the number of newspapers that belong to the centre-left (CL) and centre-right (CR), as well as the number of articles, is unbalanced because it reflects the real number of articles published in the entire period. However, the analysis of the opinion-leading press can provide a robust picture of how British newspapers adopt climate science to support their narratives. The Online Supplement provides a summary of the emergent themes, their frequencies, and examples.

Table 2: Distribution of articles that adopt science across the three blocks

Years	N Items	Centre-right	Centre-left
1988–1997	65	10	55
1998–2007	116	31	85
2008–2016	127	49	78
Total	308	90	218

4.1 Centre-left scientific frames

Four macro themes emerge from the analysis of the CL articles across the three blocks (see Online Supplement A).

A first macro-theme emphasises the scientific consensus around the causes of the problem and its future consequences by representing the scientific community as a unique voice / character of the narrative. This happens from the first block and continues throughout the period under consideration by using expressions such as “most scientists” (King, 2005) and “the evidence is mounting all-round” (The Independent, 2011). Within the consensus macro-area, two main sub-themes, which also set the scene and point out the action needed, can be identified related to i) consensus around risks / consequences and visible signs of CC (scene); ii) adaptive capacity of society (also through geoengineering technology) as a moral issue (action).

The first sub-theme shows the use of scientific frames to attribute ecological variations to CC, as well as impacts on

both humans and nature. These articles set a scene in which CC is a risk with “long-term effects” (Lean, 1995), and even when they list some potential benefits, they frequently mention negative consequences (Macalister, 2004). Such representation of the severity of CC consequences increases across the three blocks. The third block shows an evolution of the narrative in which climate science is often represented as settled around both causes and consequences of CC, which will cause “drastic harm” (Connor, 2007). A sense of urgency is emphasised due to the evident symptoms of CC such as e.g., melting “polar ice sheets” (Ashdown, 2012), hot waves records (Connor, 2014) and rising of “temperatures” (Connor, 2016).

Scientific evidence also supports a second sub-theme related to the adaptive capacity of both ecological and human systems to changes. The second block confirms that the environment can be better understood by investing in research. Negative predictions about the impact of CC are often counterbalanced by positive messages about the possibility of limiting the damage if current practices are corrected (Vidal, 2006). However, CC is predominantly represented as a risk that can cause “turbulence” (Pearce, 2006) in both human and natural systems. In the third block, even though delay in action might cause devastation, scientists are confident that there is “still time to take meaningful actions to reduce the impact” of CC (Abraham, 2016). Especially in the third block, the action becomes a “moral obligation” that involves global and social justice-related challenges (Brown, 2012).

A second macro-theme describes the scientists-characters as political and economic advisors, who encourage / support the reduction of greenhouse gases through new policies and economic strategies (Brown, 2000), and criticise some political choices (Pilkington, 2008). The second block confirms this tendency to use science either to support interdisciplinary efforts for implementing energy-related measures (Elliott & Seager, 2007) or to criticise political directions (The Guardian, 2007). The third block further encourages

economic actors and policymakers to collaborate with scientists to implement market regulation and invest in mitigation and sustainable production systems (Moodie, 2015).

A third macro-theme can be labelled as “confutation of scepticism”, which sets a scene in which scepticism is described as underpinning political-economic interests in defending oil industry activity, delaying action and disseminating misleading information. Economic and political interests are held responsible for spreading scepticism (Vaughan, 2010) and for stoking inexistent scientific controversies to delay action (Monbiot, 2009) across the three blocks. Especially in the third block, defensive tones are adopted to respond to “accusations” such as e.g., in the case of the “Climategate scandal” of November 2009 (release of more than a thousand emails and documents hacked from the University of East Anglia (see Leiserowitz, Maibach, Roser-Renouf, Smith & Dawson 2012). Defensive tones can be found e.g., when responding to sceptics’ attempts to “show that much of our recent CC is just natural” (Abraham, 2014).

Finally, a fourth macro-theme includes articles that reference both “sceptical” and “advocate” positions or refer to sceptical positions. This happens e.g., when referring to “disagreement” among scientists (McKie, 2007), a “poisoned debate” (Adam, 2010, p. 30), “exaggerated” forecasts (Nicholson-Lord, 1990) and a “receding certainty” (Pearce, 1993). In the second block, e.g., one article questions the anthropogenic causes of CC by both using mocking tones (Lawson, 2007) and referencing a documentary that contains some scientific mistakes (Boykoff, 2008). In the third block, some sceptical arguments about the impact of CC are reported and debated (Nuccitelli, 2014, 2015).

4.2 Centre-right scientific frames

Two main macro themes emerge from the analysis of the CR articles (see Online Supplement B).

A first macro-theme characterises a scene in which scepticism is narrated through three main sub-themes related

to i) scientific disagreement among the scientist-characters who disagree around different aspects of climate science (e.g., existence, causes and consequences); ii) emphasis on scientific dishonesty behind the promotion of CC; and iii) scientific uncertainty around future impact and action to be taken.

The first sub-topic emphasises the existence of sceptical positions within the scientific community and contrasting understanding of CC about several aspects. There is a tendency to refer to natural fluctuations (McCarthy, 1989) and scientists’ disagreement (Hosenball, 1990) around the causes and consequences of CC. Therefore, CC is described as a “myth” across the three blocks (Bellamy, 2004, p. 12; Daily Mail, 2002; Delingpole, 2009; Rose, 2013), and sceptics are surrounded by a scientific “aura” (Clark, 2013).

The second sub-theme expresses the dishonesty of climate scientists and sets a scene in which scientists manipulate scientific data to scare people and receive grants for their research. This topic emerges in the second block by e.g., describing scientists as “eco-doomsters” and climate science as “orthodoxy” (Phillips, 2006), and increases in the third block by quoting scientists who admit being “alarmist” about CC impact (Warren, 2014). In the second block, climate scientists are still described as a “lobby” (Jenkins, 2006) and “doom-mongers” (Hanlon, 2006), climate predictions are defined as “an art rather a science” (Simons, 1998). The third block more often accuses scientists of manipulating data to support their arguments (Delingpole, 2013) and “suppressing [dissenting] research” (Carter, 2014). Scientists are accused of receiving public money to produce studies that support tax increases. Uncertainty derives from science, which is not “settled” (Webb & Smith, 2013).

The third sub-theme shows uncertainty about both the reality/severity of CC consequences and the need for intervention. Greenhouse effect and global warming are also described as potentially beneficial (Austin, 2016; Daily Mail, 1992; Lambie, 2005). Furthermore, policies that

are based on “figures [that are not even] halfway believable” (Booker, 2009, p. 16; Webster, 2013) will cause economic damage. By contrast, CC may produce benefits for other characters of the narratives such as wine producers (Derbyshire, 2007), food producers (Beall, 2016; Prigg, 2014), producers of medical plants (Daily Mail, 1992) and the tourist sector (Batchelor, 2015; Graham, 2013).

A second macro-theme shows consensus / instrumental consensus. While some articles focus on scientific consensus around several aspects of CC, in other cases the consensus is “accepted” under certain conditions. These include the discussion of causes / consequences that are described as real (and sometimes catastrophic) if located in faraway places / scenes and distant in time, and the impossibility of tackling the problem.

A first sub-theme shows the use of “instrumental consensus”. In this case, CC consequences mainly affect nature / animals (Austin, 2016; Smith, 2001) or result from natural processes (Daily Mail, 1994). These articles also locate the problem in an abstract future (Simons, 1997) that will affect the “world’s poor” (Clover, 2007). In the second block, CC is often represented as real, but alarmist tones (e.g., “impacts of CC will be devastating”, Winter, 2004) emphasise the impossibility of acting. In the third block, a mixture of tones that range from extremely dramatic to reductive can be simultaneously found. In some cases, consensus might concern some aspects of CC, but scientific findings are described as controversial and uncertain (Collins, 2013). Examples of this tendency are expressions such as “it is possible this can be related” (McCarthy, 1992b), “before they can make more accurate predictions” (Roy, 1989) and “some scientists believe” (McCarthy, 1992a). Moreover, even when scientific consensus emerges, the lack of cooperation of some international political actors transmits a message that it is difficult to act (Radulova, 2014; Stone, 2011; Thornhill, 2013).

The second use of consensus includes a genuine recognition of the existence of CC and its related negative consequences.

The need for intervention is emphasised, especially when supporting specific energy production systems (Hardy, 2004; Leake, 2005) and discussing market mechanisms (Pearce, 1990; Stone, 2011) and technological progress as potential solutions (Highfield, 2004; Searjeant, 2005; Spencer, 2014).

5 Discussion and conclusions

Different uses of scientific frames that shape specific narratives can be identified in relation to the political orientation of newspapers. Both groups of newspapers represent either consensus or scientific disagreement but in a different way. This is directly connected to the research questions of this paper related to the identification of a potential evolution of themes associated with the use of scientific frames. The exploration of themes enabled us to understand the scene and identify the characters, plot and potential actions associated with two different narratives characterised by specific political orientation, which are in turn backed up by the use of science / scientists.

Alongside some constant macro-traits, an evolution of both narratives can be observed, which for the CL increasingly embraces scientific certainty, whereas for the CR scientific confusion.

Across the three blocks, the CL supports a plot based on scientific consensus. Science tends to be used to frame a narrative that supports the existence, severity and need to act against CC. Previous studies (Lineman, Do, Kim, & Joo 2015; Manzo, 2012) found that the adoption of positive messages and language enhances both public trust in scientists and support for CC policies (Feldman, Myers, Hmielowski, & Leiserowitz 2014; Hmielowski & Nisbet, 2016; Nisbet, Cooper, & Garrett, 2015). Accordingly, CL newspapers channel positive messages to invoke intervention and conceive scientists as political / economic advisors. However, especially in the third block, “defensive tones” are often adopted to defend the rigours of science against sceptics’ accusations. Scientific findings are also used to support a “morality” relat-

ed to climate “(in)justice”, inequalities and duty to act to protect the environment and living being’s existence.

In contrast, the CR newspapers often adopt scientific characters in their narrative who lack expertise in climate science (Dunlap & McCright, 2010; Mulvey & Shulman, 2015) and scientific language to either deny or question several aspects of the phenomenon. Some spokespersons, such as e.g., Philippe Stott (2003; Daily Mail, 2002; Matthews, 2003), are used to criticise policy intervention (Searjeant, 2004). In addition to questioning the scientific predictions about the effects of CC (Carter, 2014; Carpenter, 2011; Delingpole, 2011), the focus often shifts towards the economic impact of climate policies (Pearce, 1990; Stone, 2011) and the political nature of climate debate (Matthews, 2000; Radford, 2009). Starting from the second block, the scientific consensus increases, but the styles and arguments adopted suggest that scientific consensus can be used instrumentally. The combination of narratives that describe CC as out of human control and simultaneously refer to scientific uncertainty about the reality or the severity of these consequences, plus the description of consequences as potentially beneficial, contribute towards creating a confusing image. Scientific frames are also associated with damage to the natural environment and people who live in “faraway” places and thus are “invisible” (Ungar, 1995, 2001). Furthermore, the preference of CR newspapers for attributing responsibility to international commitments shifts the problem to a global arena (Ford & King, 2015; Moser, 2014; Takahashi & Meisner, 2013). This, in turn, further contributes towards creating an abstract image of a “faraway” problem. Therefore, the adoption of a “flood myth” style (von Burg, 2012), combined with the idea of the impossibility of acting, increases confusion. This is confirmed when the “status-quo” is explicitly and implicitly supported by using “uncertainty” to justify inaction on CC. The use of a scientific frame to support a narrative based on uncertainty about several aspects of CC might be interpreted in the light of a neoliberal press culture that

is based on conflictual instances between political and scientific characters. This has been attributed to their focus on their own agenda rather than on public matters (Phelan, 2014). CC has been interpreted as a mediating topic that generates forms of reciprocal dependency between different spheres of society (in particular, politics, science, and mass media) (Rhomborg, 2010). Further, scientific framing of climate news also sets a “politicised” scene in which sceptics and advocates contend the meaning of climate change. Therefore, even when the main characters of such narratives are represented by scientists, their actions and messages tend to assume politicised meanings, which in turn reflect the conflicts of a neoliberal scene (Phelan, 2014). The uncertainty related to scientific findings and action needed in terms of policies tends to be exacerbated by the newspapers, which tend to distinguish those scientists who believe that CC is happening and will have significant consequences (CL), and those who are sceptic (CR) (Boykoff, 2013; Rahmstorf, 2012). However, this minority of sceptical scientists have been frequently found to be supported by oil corporations (Levy & Rothenberg, 1999). While uncertainty is intrinsic to scientific models based on multiple different potential inputs used to predict future scenarios, and it is usually interpreted as a driver of progress (Corner, Whitmarsh, & Xenias, 2012), Dunlap and McCright (2010; pp. 240–259) refer to a “manufacturing uncertainty” used to overshadow the need for environmental regulation.

These findings expand the literature on how media frames can become a vehicle of either support to climate science or sceptical perspectives that cast doubts around the need for policy action. In other words, the analysis demonstrates the existence of different narratives that might influence or reinforce the opinions of newspapers’ readers, whose support is fundamental for policymaking. It should be also acknowledged that the literature on frames adopted by the media produced controversial results (Fahy, 2017). Some studies identified an evolution from a

starting phase characterised by a “(false) balance” around the scientific consensus on CC (Boykoff & Boykoff, 2004, p. 128), moving towards a disappearance over time in both the US and UK (Boykoff, 2007). By contrast, some other studies (e.g., Painter & Gavin, 2015) highlighted a persistence of sceptical sources in the English context. However, these contradictory results might also be explained in the light of a shift of attention from reporting scientific conflicts around the causes towards the consequences of climate change and the action needed (Ruiu, 2021).

Science-driven changes might be challenging for governments and economies dependent upon fossil fuel resources (Dunlap & Jacques, 2013; van Rensburg & Head, 2017). The literature shows how the carbon-dependent “status quo” is promoted by the oil lobbies by creating *ad hoc* think tanks that channel their messages (by employing “unqualified scientists”) through the mass media (McCright & Dunlap, 2003; Moser, 2010) or responding to them to protect their own interests (Bacon & Nash, 2012). Framing CC means combining multiple journalistic, public, scientific and political interpretations. For example, for the CL, Dominic Lawson (son of Nigel Lawson, a British conservative politician and journalist who founded the The Global Warming Policy Foundation, conservative think tank) criticises climate science and policy choices on CC (see e.g., Lawson, 2006, 2007, 2008). This suggests that, especially in the context of CC, editors, journalists and reporters unconsciously or consciously frame their narratives based on “interiorised” routines, which might also lead to inaccurately interpret the evolution of a phenomenon. Considering these individual interpretations in the context of the identified macro-tendencies, news workers might “interiorise” a routine in their work by combining and negotiating external pressure and their own perspectives (Berglez, 2011). However, it is not possible to speculate on newsroom mechanisms at this stage. This opens new questions for further investigation of the interplay be-

tween external pressures, journalists’ personal opinions, and knowledge about CC.

The role of narratives in influencing social life and mobilisation of people / resources has been recognised by the literature (see e.g., Bruner, 1991; Dahlstrom, 2010; Smith, 2010). Moreover, collective narratives tend to be influenced by news media, which tend to identify intentions, victims, villains, and heroes (Boholm, 2015). These findings further support studies showing that framing CC by using science to emphasise specific aspects, or by contrast neglect / discredit some others, promotes the existence of “good” and “bad” science. Accordingly, the differences between the two groups suggest that political orientation plays a role in supporting scientific consensus around CC.

Generalising these results to the four nations of the UK and covering the nuances in media framings, such as national-regional dimensions, is limited. Moreover, this study tried to provide a comprehensive picture of UK newspapers reporting by including both news and editorials (Boykoff, 2007; Boykoff & Mansfield, 2008). However, the study did not distinguish between the two types of articles and distinctive characteristics in terms of framing and narratives cannot be derived at this stage.

Conflict of interest

The authors declare no conflict of interests.

Supplementary Material

Supplementary material for this article is available online in the format provided by the authors (unedited).

<https://www.hope.uzh.ch/scoms/article/view/j.scoms.2021.02.004>

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